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Corporate-governmental Networks in the Netherlands

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Corporate networks studies have been restricted mainly to the private or business sectors. Network analyses involving both corporations and state or government agencies have been extremely rare. In this paper, the inter-corporate network of interlocking directorates in the Netherlands, based on 86 large corporations and financial institutions, is studied in terms of a bi-partite corporate–governmental network which arises from the interlocking memberships linking these corporations with major committees, agencies and similar centers of decision in the public sector or central state mechanisms in the Netherlands. The corporations, representing 27 industrial sectors, have been related to government and state agencies in 28 policy sectors. In this exploratory analysis the two heavy industries, metal/shipbuilding and chemicals/oil stand out clearly. With respect to the 17 central firms the results demonstrate consistent correspondence between their central position in the Dutch corporate network and the degree of their interlocks with policy sectors in the state. The results also show that the interlocks are overwhelmingly linked with the two policy sectors "economic affairs" and "education and sciences". Hence a more detailed analysis of the interlocks with these two policy sectors is reported.

1. Introduction

In prior studies we investigated the intercorporate network in the Netherlands in terms of the interlocking directorates of the boards of directors of the 86 largest corporations and financial institutions in this country (Mokken *et al.* 1971; Mokken and Stokman 1974b, 1978b; Helmers *et al.* 1975). These boards of directors can be considered as the main locus of the entrepreneurial function and the associated basic powers in the corporations

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*This article, a revision of an earlier paper (Mokken and Stokman 1978a), is based on prior Dutch results. It will be part of a chapter in a forthcoming book on intercorporate networks in the Netherlands.

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concerned. The personal relations, linking these boards in terms of interlocking directorates, we considered as channels of communication and influence connecting the ultimate decision centers of the corporations into an institutional network of influence and power.

However, these studies were restricted to the corporate sector only, investigating the internal properties of this network. The next step would seem to be to study the relations of this corporate network to its extracorporate "environment" and, more specifically, to similar centers of decision in the public sector or the state. This latter step, however, seems to be extremely rare in the research considered here, if it has ever been made. If one surveys the literature on interlocking directorates (see Fennema and Schijf 1978) and in related areas, it can be noted that by far the most, if not all, studies are predominantly focussed on the corporate or private sector only. This seems to be a product of the disciplinary attitude underlying the traditional distinction between a *private* and a *public* sector in Western capitalist society, each operating in a separate social domain and to be studied apart. More recently, social scientists and economists have come to realize that this distinction, if it ever actually existed, certainly no longer holds in the reality of modern Western societies. "In the new political economy, the traditional distinction between the public and private sectors has become nearly obliterated through the flow of public funds to universities, industry, non-profit institutions, voluntary hospitals, social welfare agencies, and other quasi-public entities." (Smith 1975:8). What once may have seemed to be a fairly clear-cut division of separate social domains with distinct functions, has been replaced by a vast symbiotic area of quasi-public or semi-private corporate activity.

This point has been strongly emphasized in recent efforts to develop theories for the system of public institutions in the state sector, usually referred to as theories of the state. These theories, at the moment mainly developed by Marxist or Marxian-inspired writers, usually are formulated at such a high level of abstraction as to be hard to apply to concrete empirical research. Moreover, they tend to stress different characteristics as fundamental to the state in a capitalist society.

Some emphasize the *instrumental* significance of the state for the capitalist system, for instance as a coercive tool to ensure the interests and position of a ruling class (Miliband 1969). Another, non-Marxian, example is the theory implicit in or at the background of modern (Keynsian) economics where the state operates as an outside mechanism of global regulation. Others (*e.g.* Poulantzas 1968) stress the all-pervasive *structural-functional* aspects of the state for the maintenance, functioning, reproduction and development of the capitalist mode of production. Some authors, such as Offe (1972) underline the dependency of the state system on the process of capitalist accumulation itself to a degree where an impending crisis in the capitalist system should be expected within its state structures, and not primarily through the class struggle as in traditional Marxist analysis.

More suited to the research reported here is the view of O'Connor (1973). He states that the productive and distributive developments within the

capitalist private sector have divided it in two sectors. The *competitive* sector is characterized by small firms and small-scale production, with markets of at most local or regional importance and a lack of organized labor. The *monopoly* sector is characterized by large-scale production, strongly oligopolistic markets of (inter-)national scope and well-organized labor unions. As this monopoly sector is typically the domain of the large corporation it may be considered as equivalent to the corporate sector covered by such studies as ours. Now the close interaction and interpenetration between the private and the state sectors mainly involves the monopoly sector. The growth and development of the monopoly sector has been incited by the parallel expansion of the state sector so that the development of the corporate and state sectors should be studied as a single process (O'Connor 1973: 23 ff). The increasing interdependence within capitalist production and distribution requires vast amounts of technical and social infrastructure, the development of which originates in the state sector through social investment (technical infrastructure: communications, roads, harbours, *etc.*) and social consumption (social welfare, suburban development, educational system, *etc.*).

This view rightly stresses the *mutuality* of the interaction and dependence relations between the corporate sector and that of the state. Each sector can develop its own initiatives and momentum within the confines of that mutual interdependence. The state sector therefore can be conceived as a system of actors with particular and characteristic interests and dynamics, equalling in size and weight those in the corporate sector. Its socio-economic weight can be summarized in its many economic functions.

The state system is a large *productive* unit if we look at the goods and services the modern states produce entirely on a public basis or with heavy state participation in the private sector. It also forms a huge market in its role as *contractor* to the production of goods and services by private industry for its own deployment or operating as a large unit of (social) *consumption*. As the largest *employer* the state system dominates a significant part of the labor market. By means of its *redistributive* powers in its role of welfare state and by the deployment of revenue from taxation and levies, it can and does profoundly effect the conditions in many markets. Finally, the state through legislation and economic policy, can, to a certain degree, operate as a *regulator* of economic conditions.

These theoretical considerations are certainly relevant to the study of the structure of a corporate network, as revealed by the network of interlocking directorates.[1] The strong interdependence and interpenetration of the corporate and state sectors suggest the study of the connections of the corporate network with corresponding points of decision in the state network. Adequate communicative access and representation in these state and government agencies provide corporate actors with the possibility of transmitting

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[1] For the significance of interlocking directorates as indicators of intercorporate structure, see the review by Fennema and Schijf in this issue.

information and demands at the input level as well as opportunities to gather information and anticipate policies at the output level. A differential advantage of access for certain corporate actors in this state network may well give these actors the capacity to determine or even fix the alternatives or outcomes of decisive processes originating in the state sector. Such actors then occupy particular positions of influence or power in that state network (Mokken and Stokman 1974a). An example of such a structural advantage of access was given in our former studies of the Dutch intercorporate network of interlocking directorates: corporations, or groups of corporations, which were central in that network (*e.g.* the major financial units, such as the big banks) occupied positions which induced superior access and hence influence or even power in the global network.

The theories and considerations referred to above are not sufficiently specific yet to warrant the formulation or testing of hypotheses at a concrete empirical level in such analyses as are to be reported in this paper. They can, however, guide the formulation of some questions and interpretations of results concerning the connection of the corporate network of interlocking directorates with the network based on common memberships in decision-making bodies (committees, boards, councils, *etc.*) in the central state organization of the Netherlands.

How important, in terms of number of linkages and directors inducing these, is that corporate–state network compared with the intercorporate network itself? In which ways are different parts of that corporate network (*e.g.* central firms *vs.* peripheral ones) connected with the state network? What types of connection have specific important groups of corporations, such as the financial institutions, or those in the basic industries? How do these relate to different segments of the state network associated with major policy areas like education, housing or trade? Can different strategies or modes of connection be distinguished, such as a large spread across many state agencies or policy areas *versus* a high penetration in a narrow policy area?

2. The institutional data of 1969

The research reported here is based on our study of the network of interlocking directorates on the largest 64 industrial and commercial corporations in the Netherlands, together with the 22 largest Dutch financial enterprises (banks, insurance companies, *etc.*). The criteria of size and the composition of the boards of directors were based on those given in the annual reports of the institutions concerned for the year 1969. Hence we shall refer to this study as "the 1969 study". Among these 86 corporate institutions we included the data for a number of sizeable public or semi-public institutions, which were directly operative in the productive, commercial or financial areas covered by the private sector. These included, for instance, such organizations as the fully nationalized postal and telephone services (PTT), one

fully state-owned chemical concern, which operates as a corporate actor in the private sector (DSM), and the Bank of the Netherlands (*Nederlandse Bank*) as another privately incorporated, but fully government-owned institution. Also included were the *Bankraad*, an advisory council of the minister of finance with respect to the policies of the Bank of the Netherlands, the *Bank voor Nederlandse Gemeenten*, a state-owned bank regulating finance and credit for the lower communal authorities, and the board of the Schiphol Airport authority, which is controlled by the city of Amsterdam.

These specific state- and government-owned institutions, although more or less clearly belonging to the public domain, were considered by us to be operating fully in the productive or financial area or, for that matter, mainly on the private side of the parapublic sector. We therefore allotted them for the analysis of this study to the side of the corporate sector of 86 concerns and institutions in total.

For an analysis of the interrelation and interpenetration of the corporate sector with the public policy structure of state and government, we needed indicators concerning mutual formal or regular communication structures involving a potentially wide variety of state and governmental agencies and committees. There are no sources which systematically and more or less exhaustively report these data. The most extensive single source is the annual government directory (*Staatsalmanak*). In order to achieve the best possible correspondence with the data of the 1969 study we selected the government directory for the year 1970, which mainly reports data for the prior year. In this sense we hoped to get as close as possible to the interlocks between corporations and state agencies in the period studied.

The government directory primarily reports data concerning the identity and directorial composition of directorates and institutions (bureaus, offices, agencies, committees, *etc.*) within the framework of the various departments of state, to which they are formally affiliated administratively. The directory lists the top officials of the various departments of state, ordered according to the different directorates and policy sections. Then the main policy determining agencies and advisory committees which fall under these departments are listed, as well as affiliated institutions taking part in the execution, implementation or administration of specific policies. To these we could add the governors (*Commisarissen der Koningin*) and executives (*Gedeputeerde Staten*) of the provinces, as well as the mayor and aldermen of the largest cities with more than 100 000 inhabitants in 1969. We therefore thought we had sufficient reason to consider the government directory as a reasonable list of the more important decision-making and executive units in the general policy areas covered by the central structure of state and government in the Netherlands.

However, an important *caveat* should be made. The decision concerning which information is to be listed in the government directory is taken by the ministry or department of state itself, depending also on the administrative efficiency, initiative and rigor of those agencies supplying the necessary annual up-dated information. Moreover, there are many cases where the

existence or composition of committees or other bodies are not made public for reasons of confidentiality, the safety of the state, the public interest or other reasons of policy. The department of defense and the intelligence service (BVD) are rather obvious examples. We may therefore have missed many important or relevant agencies. If this lack of information is distributed unevenly over the policy areas (defense!) then our results will be biased correspondingly.

A comparison between the register of persons in the directory and our list of directors of the 86 corporations of the 1969 study enabled us to trace the interlocks of these corporations with the various governmental and other public agencies. Obviously, owing to the very dissimilar types of affiliations in the government directory, these interlocks between corporations and state agencies will vary considerably in significance. For instance, interlocks may concern a member of parliament, a leading official in a department, a chairman of a public research institute, or members of advisory committees at very different levels of activity and importance. Our data, therefore, are much less homogeneous than those we used for the network between corporations, the latter being based only on common membership in the ultimately controlling bodies of these corporations: the boards of directors.

Our survey of the interlocks of these boards with positions in the central structure of state and government consequently mainly serves the purpose of studying the global distribution of the points of access of the corporate structure to that of the state. Moreover, this study is, by the nature of our data, restricted only to the top level, the boards, of these corporations, so that we may well have singled out their more significant linkages. On the other hand, the corporate structure will be more densely intertwined with state and governmental agencies through the participation of officials at other, lower or more specialized, levels in the corporations. Evidently, our study does not provide insight into those.

The data from the government directory allowed us to distinguish different policy sectors in the state structure. This gave us the opportunity to study to some degree the distribution of access of the corporations, or certain types of these, across policy sectors. For instance, one may study whether they concentrate their contacts in certain specific policy areas or whether they have a more general orientation across policy sectors instead. Again, one may investigate the *penetration* of a set of corporations in a given policy area, a heavy penetration being characterized by a sizeable number of interlocks in a single policy sector. A high degree of *spread*, on the other hand, can be found when a large number of interlocks is distributed over a wide variety of policy areas.

For these reasons we have aggregated the government institutions in 28 policy sectors, fourteen of which roughly coincide with the fourteen departments of state which existed in 1969. Of these departments we have allotted to five separate sectors state corporations and financial institutions which were similar to, but not selected from, the large state institutions in our set of 86 large corporations and institutions. Finally, nine sectors relate to dif-

ferent public areas such as the two chambers of parliament (*Eerste* and *Tweede Kamer*), the highest public and administrative legal court: the council of state (*Raad van State*), the royal house, the provinces and the larger cities and townships. As before, the corporate sector of 86 firms and institutions were arranged in 27 industrial sectors or industries, including the main enterprises and financial institutions of the state.

In the next sections we shall first give some general results concerning the network of interlocks between the boards of these corporations and the state institutions. As we shall find a striking preponderance among the departments of *economic affairs* and *education and sciences*, we shall then report a more detailed analysis of the interlocks with these departments in § § 6 and 7.

3. General features of the network

A first survey of the distribution and density of the interlocking network between our 86 large Dutch corporations and the state agencies is given in Table 1. Between their boards of directors and the state and government institutions for 1969, 688 interlocks were found, as far as the government directory is concerned: an average of 8.0 interlocks per corporation. These 688 interlocks between corporations and government were generated by 191 persons. They connected 80 of the 86 corporations *directly* with the state through one or more interlocks. This number of interlocks may be considered to be high, if we compare it with the number of interlocks cementing the intercorporate network between the 86 corporations themselves. In 1969, this latter, intercorporate, network was built on 873 interlocks and generated by 195 persons. A comparison of these numbers suggests that, for the corporate sector of the economy, interlocking memberships with the agencies of the state are of similar importance to them as those which are linking the controlling bodies of these concerns. *A fortiori*, it may then seem likely that on the average such interlocks tend to indicate important contacts between corporations and government in probably relevant policy areas.

The density of the bipartite graph on 86 corporations and 28 policy sectors is 0.15.[2] This relatively *low* density (or number of lines), in the presence of the *large* number of 688 interlocks, clearly suggests that many of the lines are generated by a large number of interlocks: *i.e.* a number of these lines have sizeable weights.

The six corporations with no immediate interlocks with state agencies included two large rural dairy cooperatives, and four firms in the garments, shipping, retail trade and rubber sectors. Their marginal position here

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[2] The bipartite density gives the proportion of observed lines actually connecting corporations with state (or policy) sectors of the maximum number of possible lines of that type. A line is defined with the existence of at least one interlock. In other words: the multigraphs of interlocks is reduced to a simple graph of lines.

Table 1. *Interlocks of industrial sectors with policy sectors*

Industrial sector	(1) No. of firms	(2) No. of firms interlocked with govt.	(3) No. of political sectors interlocked	(4) No. of interlocks	(5) No. of interlocks per firm	(6) Bipartite density	(7) Density of induced graph govt.
Natural gas (Gasunie)	1	1	3	14	14.0	0.11	0.01
Foodstuffs	6	4	14	26	4.3	0.13	0.12
Textiles	3	3	8	13	4.3	0.12	0.03
Garments	1	0	0	0	0	0.00	0.00
Paper	3	3	5	9	3.0	0.07	0.01
Printing/publishing	3	3	8	14	4.7	0.13	0.04
Leather/rubber	2	1	3	4	2.0	0.05	0.01
Chemicals/oil	3	3	7	41	13.7	0.14	0.05
Chemicals (state-owned: DSM)	1	1	7	20	20.0	0.25	0.06
Glass, pottery	1	1	2	2	2.0	0.07	0.00
Metal/shipbuilding	8	8	18	94	11.8	0.19	0.20
Electrotechnical/metallurgy	6	6	12	39	6.5	0.16	0.11
Building trade	5	5	7	24	4.8	0.11	0.03
Rural development (KN Heide Mij)	1	1	11	21	21.0	0.39	0.15
Wholesale trade	8	7	14	37	4.6	0.11	0.11
Retail trade	3	3	8	20	6.7	0.14	0.04
Transport	6	5	15	47	7.8	0.16	0.23
Transport (state-owned), national railways (NS)	1	1	5	14	14.0	0.18	0.03
Communications (state-owned)	2	2	8	19	9.5	0.18	0.05
Commercial banks	3	3	14	41	13.7	0.29	0.19
Agricultural banks	2	2	10	21	11.5	0.23	0.10
Mortgage banks	2	2	7	9	4.5	0.14	0.03
Investment companies	3	3	3	18	6.0	0.08	0.01
Real estate (EMS)	1	1	1	1	1.0	0.04	0.00
Insurance companies	5	5	18	42	8.5	0.19	0.14
Chamber of insurance	1	1	2	6	6.0	0.07	0.00
Financial state-institutions	5	5	17	92	18.4	0.27	0.25
Total	86	80	25	688	8.0	0.15	0.61

strikingly reflected their equally marginal position in the intercorporate network which consisted of a connected component of 84 firms. The two isolates there were also isolated here.

If we consider the average number of government interlocks per firm (column (5) of Table 1) we can immediately verify the obvious circumstance that the state-owned or state-controlled corporations and institutions are among the highest ranking. *De Staatsmijnen* (DSM), the state-owned Dutch chemical industry has 20 government interlocks, followed by the financial state institutions (an average per firm of 18.4); NS (national railroad system) and *Gasunie* (the half state, half Shell–Exxon controlled natural gas monopoly) each with 14 interlocks. These state institutions may serve as a yardstick for the degree of government interlocks of other industrial sectors. In Table 1 we can select by that criterion as equally strongly interlocked KN Heide Mij (the largest Dutch rural and agricultural development corporation) with 21 interlocks, chemicals/oil and the commercial banks (an average of 13.7), metals/shipbuilding (11.8) and the agricultural banks (11.5).

As was the case for the intercorporate network, the basic industries (metals/shipbuilding and chemicals/oil) and the commercial banks figure prominently in this bipartite corporate–government network. Most interesting is the prominence in this policy network of the agricultural institutions which had proven to be rather marginal in the intercorporate network in our earlier analyses. For the agricultural banks it is reminiscent of the farmers' lobby (*die Grüne Front*) and a similar policy background may explain the strikingly prominent position of the rural and agricultural development giant (KN Heide Mij). The agricultural policy area and rural or regional development projects depend strongly on state subventions and government contracting concentrated in the departments of agriculture and fisheries, public works and waterways, and economic affairs.

Columns (3) and (6) of Table 1 give insight into the *spread* of the interlocks across policy sectors. Column (3) gives the number of policy sectors with which firms in a given industrial sector are directly interlocked. The bipartite density (as defined in footnote 2), given in column (6), controlling for the number of firms in the industrial sector concerned, therefore can be considered as a measure of spread normalized for number of firms.[3]

The industrial sectors with the highest spread per firm (bipartite density) are:

KN Heide Mij	0.39
Commercial banks	0.29
Financial state institutions	0.27
Chemicals (state-owned: DSM)	0.25
Agricultural banks	0.23

[3] The bipartite density, as defined in footnote 2, can be interpreted here as the percentage of policy sectors with which *on the average* a firm in the industrial sector is directly interlocked.

A striking feature is the larger spread across policy sectors of the financial sectors in comparison with the others. (See the commercial and agricultural banks and, to a lesser degree, the insurance companies.)

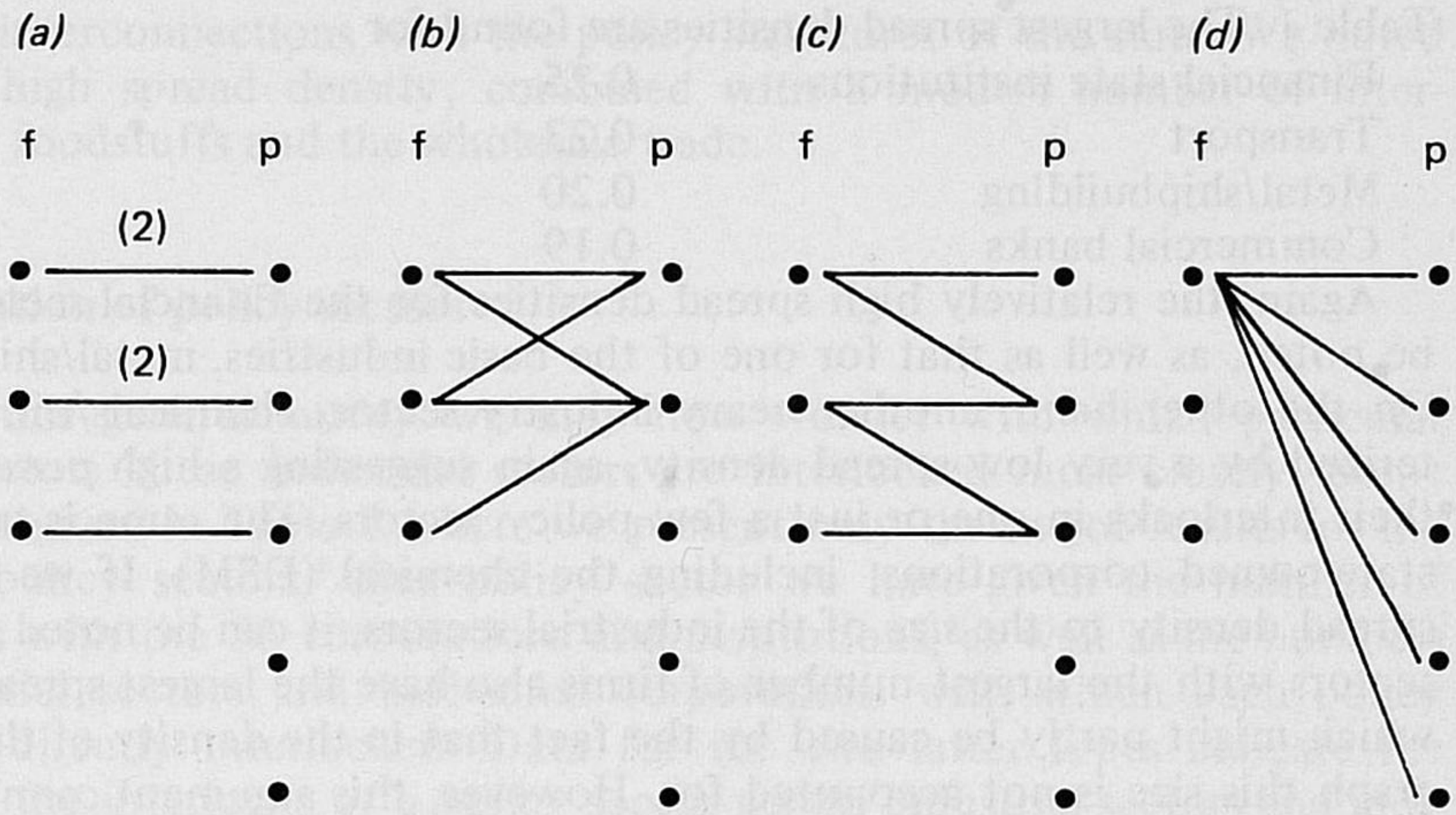
Given their low numbers of interlocks (7.8, 6.7 and 6.5, respectively) the sectors transportation, retail trade and electrotechnical/metallurgy have a relatively large spread (bipartite densities: 0.16, 0.14, 0.16). On the other hand, the basic industrial sectors chemicals/oil and natural gas (Gasunie) and to a lesser degree metal/shipbuilding are characterized by a relatively *low* spread with respect to a *large* number of interlocks per firm. Here we tend to have a heavy *penetration* in a small number of policy sectors.

We have introduced for a given industrial sector, as a set of firms, the concept of spread of their lines (as based on their interlocks) across the set of policy sectors. A measure of that spread was given by the bipartite density (see footnote 2), which can be interpreted as the proportion of policy sectors with which a firm in that industrial sector is, on the average, directly interlocked (see footnote 3). However, these direct interlocks can be considered to induce a secondary communication structure in the set of policy sectors in the sense that two policy sectors are connected by those firms in a given industrial sector with which they *both* are interlocked. The situation is illustrated in the hypothetical example of Figure 1. In case (a) no two policy sectors are connected in this sense as they have no common interlocks with a firm, although there are lines based on five interlocks to three firms. In case (d) any two policy sectors are connected by a common interlock with the same firm.

In the empirical analysis of networks and graphs the emphasis is usually on the direct connections as based on the original graph or network. In bipartite situations, such as here, where the points can be partitioned into two sets, industrial sector and policy sectors, it can be worthwhile to analyse more specifically the graph structure induced in one set of points through their common linkages to points of the other set. This derived structure can be represented by the induced graph in the former set of points, in which a line between two points exists, as soon as both are directly connected (*i.e.* interlocked) with at least one point in the latter set. Consequently, in our case, for any given industrial sector (as a set of firms) the spread of their lines, or the interlocks they carry across various policy sectors, may be considered to induce such a secondary network structure linking these policy sectors. Therefore this derived structure can be represented by the induced graph on those policy sectors in which a line between two policy sectors exists, as soon as one corporation has at least one interlock with both sectors: *i.e.* when directors of one of the firms in the industrial sector concerned have positions within each of those two policy sectors. Again, in Figure 1 that induced network will be totally disconnected in case (a) and completely connected in case (d). Each industrial sector generates a specific induced network linking the set of policy sectors to which its firms are connected. However, the density of this induced network can vary considerably, depending on the way these lines are *spread* across the policy

sectors. We may illustrate this with the hypothetical examples of Figure 1. The examples concern various situations for an industrial sector, consisting of three corporations, which are linked by five interlocks with five government sectors.

Figure 1. *Hypothetical example of bipartite graphs on three firms (f) and five policy sectors (p)*



	(*a*)	(*b*)	(*c*)	(*d*)
Bipartite density	0.20	0.33	0.33	0.33
Density of induced graph on 5 policy sectors: spread density	0.00	0.10	0.20	1.00

In Figure 1(a) these five interlocks are carried by three lines, two of which are of weight 2, as these are based on two interlocks each. Its spread, as indicated by the bipartite density, is therefore 0.20. The density of the induced graph, however, is zero, as the policy sectors are not interlocked through common interlocks with firms in the industrial sector. In the other cases these bipartite densities are higher: 0.33, because each of the five interlocks generate a line (of weight 1). However, the densities *of the induced graph* vary considerably, increasing from 0.10 (case (b)) and 0.20 (case (c)) to 1.00 for case (d), where the five interlocks of a single firm with each of the policy sectors induces a complete graph on these sectors.

Because for a given industrial sector this density of the induced graph on the policy sectors also depends on the spread of the lines of its firms across

these policy sectors, we can refer to this density here as the *spread density* of an industrial sector in the policy sectors. We observe a low value of the spread density when an industrial sector concentrates on a limited number of policy sectors. A high value is found when the firms, individually or together, distribute their lines across various policy sectors. In this latter case various policy sectors are connected with each other through common interlocks with firms in that sector.

The spread densities for our industrial sectors are given by the densities of their induced graphs on the policy sectors, as listed in column (7) of Table 1. The largest spread densities are found for

Financial state institutions	0.25
Transport	0.23
Metal/shipbuilding	0.20
Commercial banks	0.19

Again, the relatively high spread densities for the financial sectors should be noted, as well as that for one of the basic industries, metal/shipbuilding. On the other hand, another heavy industry sector, chemicals/oil, is characterized by a very low spread density, again suggesting a high *penetration* of their interlocks in one or just a few policy sectors. The same is true for the state-owned corporations, including the chemical (DSM). If we relate the spread density to the *size* of the industrial sectors, it can be noted that those sectors with the largest number of firms also have the largest spread density, which might partly be caused by the fact that in the density of the induced graph this size is not accounted for. However, this argument cannot explain completely the high spread density of the larger sectors, as can be seen by a comparison of the data for the sectors "foodstuffs" and "building trade". These are of about equal size (six and five firms, respectively) and have comparable numbers of interlocks (averages per firm of 4.3 and 4.8) and densities (0.13 and 0.11), respectively. Yet the spread density of the building trade (0.03) is considerably lower than that of "foodstuffs" (0.12). In fact, "foodstuffs" and the sector "wholesale" trade are quite remarkable in Table 1, showing a very high spread density across policy sectors in comparison with their bipartite policy sector densities and modest numbers of interlocks per firm. For these sectors the interlocks are distributed optimally, promoting spread and the interconnection of policy sectors instead of penetration.

Now let us summarize our main findings as based on Table 1. A first conclusion is that the 86 corporations were interlocked with the 28 policy sectors at the central state level as tightly as they were interlocked amongst themselves. If we look at the *average number of interlocks per firm*, the number of interlocks of the state-owned corporations gives a good criterion of the strength of this type of linkage to the state sectors. In terms of that criterion the basic industries (metal/shipbuilding and chemicals/oil) and the financial sectors (commercial banks, agricultural banks), together with the agricultural and rural development corporation (KN Heide Mij) were as heavily connected as the state-owned institutions.

Then we considered the way the interlocks of the sectors were distributed across policy sectors in terms of *spread*, as indicated by the bipartite density and spread density, or *penetration:* large numbers of interlocks, low level of spread. The financial sectors showed a wide spread across the policy sectors. In terms of spread density, this was also the case for metal/shipbuilding. This heavy industry sector contrasted strongly here with the other basic sector of chemicals/oil (and natural gas (DSM)), which instead showed a large degree of penetration, as did the state-owned corporations. These two basic industrial sectors therefore showed fundamentally different patterns for their interconnections with the policy structures of the state. We noted also the high spread density, combined with a modest number of interlocks, for foodstuffs and the wholesale trade.

4. Orientation of policy sectors

After this general survey we may now wonder with which particular policy sectors these industrial sectors are interlocked most closely. Some results are given in Table 2 where we present only the major results for the relevant policy sectors.[4] Per policy sector we have given the number of interlocks with the 86 corporations and institutions, as well as the numbers of industrial sectors and individual corporations with which each policy sector is directly interlocked. Data for the two latter types indicate the spread of the interlocks of a policy sector across industrial sectors and individual firms.

From Table 2 it will be immediately evident that the interlocks are overwhelmingly linked with the two policy sectors of "education and sciences" and "economic affairs". "Education and sciences" is connected to 53 of the 86 corporations by means of 176 interlocks. For "economic affairs" even more corporations, 61, are connected through 151 interlocks. Both policy sectors have a very large spread across the industrial sectors, as they are directly connected with corporations in 23 out of a total of 27 of these. Far below these two policy sectors come the three policy sectors that are leading the rest in terms of numbers of interlocks: "finance", "foreign affairs" and "public works and waterways".

The position of "finance" with respect to "economic affairs" is especially striking. On the basis of Table 2 we may conclude that in what in Dutch politics is known as the "socio-economic triangle" (the departments of state of economic affairs, finance, and social work and public health), "economic affairs" is by far the most important, where interlocks with the corporate sector are concerned. Next is "finance", closely followed by "social work and public health".

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[4] For reasons of space we have omitted a few government sectors which could be considered to be of minor importance.

Table 2. *Interlocks of policy sectors and firms*

Policy sector	No. of industrial sectors interlocked	No. of firms interlocked	No. of interlocks
Prime minister	3	3	3
Overseas territories	10	14	23
Foreign affairs	12	26	31
Justice	11	14	15
Home affairs	11	14	18
Education and sciences	23	53	176
Finance	17	27	40
Finance: participating company in overseas territories*	8	10	19
Finance: investment company in developing countries	10	11	18
Defense	5	6	18
Defense: artillery plants	2	2	2
Public housing, environmental policy	3	3	4
Public works, waterways	11	21	29
Economic affairs	23	61	151
Agriculture and fisheries	3	4	8
Social affairs, public health	12	16	22
Culture, recreation, social work (CRM)	13	18	19
Second chamber of parliament (lower house)	7	8	9
First chamber of parliament (upper house)	10	14	16
Houses of parliament, sundry	1	1	2
Royal house	8	13	24
Council of state (Raad v. State)	7	11	12
Council of state, sundry	4	4	6
Provincial authorities	9	12	15
City authorities	4	4	8
Total	25	80	688

*Partnership companies in Surinam and Dutch Antilles.

Of course, we should keep in mind that quite a number of interlocks in the area of the policy sector "finance" have not been counted, because of our decision to include a number of the state-controlled institutions in this policy area among the 86 corporations in the private sector. The same, however, is true for "economic affairs", under the competence of which a number of state-owned corporations fall.

The results for the policy sector "defense", if taken at their face value, seem to contradict the results directed at the unravelling of the military–industrial complex. Many studies in this area postulate or report close relations between the military establishment and the corporate leadership (for a good survey see Rosen 1973). Very few interlocks are given for defense. Of the 86 corporations only six are connected with "defense" by means of 18 interlocking directorates. The chapter on defense in the government directory is very concise. Only a small number of committees have been reported. The small number of interlocks found by us may well have been

the result of a certain reticence, which the authorities of the department of defense feel obliged to observe, when it comes to publicly reporting information of this nature. The existence or composition of many agencies or committees in the policy area of defense will usually be stamped as confidential or secret more easily than in other areas of public policy.

How are the various industrial sectors connected with the various policy sectors? Again we found the policy sectors of "education and sciences" and "economic affairs" to have the largest spread across industrial sectors: they were virtually interlocked with all industrial sectors with the largest number of interlocks in each of them. In § 7 we shall see that almost all interlocks of "education and sciences" originated in that sector in those agencies which were associated with scientific education, science policy or research.

The ties with "finance" are mainly with the state-owned firms and the financial state institutions. It is remarkable that there are no interlocks with commercial banks. This may be due mainly to the circumstance that we included the state-owned institutions among the 86 corporations and not in the state sector. In our analysis of the networks among these 86 corporations we found the commercial banks to be heavily interlocked with these financial state institutions!

With respect to the other policy sectors, where the interlocks are much less pronounced, the data suggest rather clearly that these interlocks are with those policy sectors which on face value seem to be most relevant to the economic activity of the industrial sectors or firms involved by such ties.

For instance, our selection of the 86 largest Dutch corporations and institutions implied an emphasis on the national scope or orientation of business activity. Consequently, we do not really cover more regionally oriented economic institutions, unless they happened to be selected merely on the basis of their size. As we saw before, these proved to be peripheral in the network linking the 86 institutions. They can be found to represent more or less the rural or agricultural sector with the agricultural banks and the rural development company KN Heide Mij. The interlocks of these have an orientation towards the policy sectors, which differs notably from that of the other sectors. They are virtually the only ones interlocked with "agriculture and fisheries". They have the largest number of interlocks per firm with the two Chambers of Parliament, again faintly reflecting something like the "farmers' lobby". Moreover, they have the largest number of interlocks per firm with the "provinces". A similar focus on policy sectors immediately relevant to their specific commercial or industrial activity is suggested for the "building" trade with which "public housing and environmental policy" in particular is interlocked (0.4 per firm). Defense has most of its (modest) number of interlocks with metal/shipbuilding (1.3 per firm).

5. The center of 17 corporations

In our analysis of the intercorporate network of interlocks among the 86 firms and institutions we found one component of 84 corporations with a

density of 0.20. In that component the 17 most central corporations[5] formed more or less a single center with a high density (0.76). This corporate center consisted of

the two major commercial banks (ABN and AMRO);

the three main insurance companies (Delta Lloyd, Eerste-Nillmij (Ennia) and Nationale Nederlanden);

two financial state institutions: the Bank of the Netherlands (Nederlandse Bank) and the national investment bank (Nationale Investeringsbank);

two closely connected investment companies;

the Dutch multinational chemical concern AKZO;

three concerns in the sector metal/shipbuilding (Dutch steel Hoogovens, the American-owned Thomassen and Drijver Verblifa and the shipbuilding concern Rijn-Schelde);

three concerns in transport: shipping (NSU), Dutch railways (NS) and the Royal Dutch Airlines (KLM);

one brewery concern: Heineken.

Was this corporate center, these 17 most central corporations, more closely connected with the policy sectors than the other concerns and institutions? In Table 3 we present the data concerning the policy sectors, with which these 17 central firms were most prominently interlocked (ten interlocks or more).

Altogether the 17 had a total of 262 interlocks with the state sector, *i.e.* 38% of the total number of interlockings for all 86 corporations with the policy sectors. As they among themselves add up to 20% of the firms we studied, this indeed suggests that on the whole the center was more closely connected with the policy sectors than were the other corporations. This is consistently confirmed by the second column of Table 3, where for a policy sector the interlocks of the 17 are given as a percentage of the total number of interlocks of all 86 corporations to that policy sector. These are all above their percentage weight of 20%.

These facts are confirmed if we look at the number of interlocks per individual central corporation. We saw before that all 86 corporations and institutions have an average of 8.0 interlocks per firm with the state sector. Only two of the 17 central corporations have a slightly smaller number of interlocks: the shipping concern NSU and the insurance company Nationale Nederlanden (six each). All the others have eight (in one case) or more. These data therefore demonstrate the striking and consistent correspondence of their central position in the Dutch corporate network and the degree of their interlocks with policy sectors in the state.

The *distribution* of the interlocks of these central 17 corporations across the policy sectors was also different from that of all 86 firms which we presented before in Table 2. It is more concentrated on the policy sectors indicated in Table 3 and less on the others than was the case for the 86.

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[5] The point centrality of a corporation was measured on the basis of neighborhood size (degree) and mean distance to other corporations in the graph.

Table 3. *Most prominent interlocks of 17 most central corporations**

	No. of interlocks with the 17	% of total No. of interlocks to policy sector
Foreign affairs	13	42
Education and science	71	40
Finance	12	30
Finance: partnership companies in Surinam and Dutch Antilles	10	53
Finance: national investment bank for developing countries	11	61
Defense	11	61
Public works, waterways	15	52
Economic affairs	58	38
Royal house	11	46
Other sectors	50	27
All policy sectors	262	38

*Only those policy sectors are given that have ten or more interlocks with the center of 17 corporations.

Had we applied a comparable criterion of "prominence"[6] for the data in Table 2, we would have found, apart from the common predominance of "education and science" and "economic affairs", only "foreign affairs", "finance" and "public works and waterways" among the most prominently interlocked policy sectors for the 86. We can see from Table 3 that for the center of 17 corporations we should add to that list:

two financial state institutions for investment, trade and aid with the former West Indian colonies (Surinam and the Dutch Antilles) and other developing countries;

"defense", which in comparison with the total corporate structure of the 86 is much more interlocked with the center of 17;

the "royal house", an aggregate policy sector in our study based on public functions of members of the royal family and positions of others in such councils and offices as are associated with the constitutional activities and duties of the Queen.

Having analyzed the structure of the interlocking network connecting the boards of directors of the 86 corporations and institutions of our study with agencies in the policy sectors of the state structure, we may now study more specifically the nature of these interlocks with particular policy areas *within* these sectors. As we found a striking preponderance of connections with the policy sectors of "education and science" and "economic affairs", we shall restrict our analyses to these sectors. This will be done in the next two sections.

[6]Considering 10 or more interlocks out of the 262 interlocks of the 17, corresponds to 27 or more out of the 688 interlocks of the 86.

6. The policy sector "economic affairs"

The reader should keep in mind our prior explanations concerning the nature of our policy sector "economic affairs". It covers not equivalently the regular ministry of economic affairs, as we have also associated with this sector semi-public and advisory agencies and committees which may be considered to operate mainly within the policy area of this ministry. Which are the policy areas within this policy sector showing significant interlocks with the corporate structure of our study? Our results are given in Table 4. They are confined to industrial sectors only, and only those industrial sectors with interlocks in economic affairs have been reported.[7] Moreover,

Table 4. *Interlocks of industrial sectors and economic affairs*

Industrial sector	I	II	III	IV	V	VI	VII	VIII	IX	X
Natural gas (Gasunie)	1					2	3		6	6.0
Foodstuffs		2	1	1	1				5	0.8
Textiles		1		1					2	0.7
Paper		2			1				3	1.0
Printing/publishing		3	1		1	1			6	2.0
Chemicals/oil		1			1	1	5	2	10	3.3
Chemicals (state-owned: DSM)	2	1		1		1	1	2	8	8.0
Glass/pottery		1							1	1.0
Metal/shipbuilding	2	2	5	2		6	6	1	24	3.0
Electrotechnical/metallurgy		2	1	1		1	4		9	1.5
Building trade		2	3	2				1	8	1.6
Rural development (KN Heide Mij)				1			1		2	2.0
Wholesale trade		1	1	1	1	3	4		11	1.4
Retail trade					1			1	2	0.7
Transport		2	1		1	1	1		6	1.0
Transport (state-owned), national railways (NS)	2	1					1	1	5	5.0
Communications (state-owned)		1	1			1	1		4	2.0
Commercial banks				1		1			2	0.7
Agricultural banks				1	1			1	3	1.5
Investment companies		5			1				6	2.0
Real estate					1				1	1.0
Insurance companies		1	2	1	1				5	1.0
Financial state institutions	1	4	4	1	2	1	5	4	22	4.4
Total No. of interlocks	8	32	20	14	13	19	32	13	151	1.8
Total No. of firms	5	22	16	14	13	16	17	10	61	
Total No. of industrial sectors	5	17	10	12	12	11	11	8	23	

I, top department; II, foreign economic relations; III, industrial development; IV, committee economic competition; V, chambers of commerce; VI, energy; VII, nuclear energy, VIII, statistics and planning; IX, total No. of interlocks; X, No. per firm.

[7] Four of the 27 industrial sectors had no interlocks: garments, leather/rubber, mortgage banks, and the chamber of insurance.

we have given in columns of Table 4 only those subareas of the policy sector "economic affairs" with interlocks to some industrial sector.

The industrial sectors with the largest number of interlocks per firm with "economic affairs" were the state-owned chemical (DSM), the partly state-owned natural gas (Gasunie), the state-owned national railways (NS) and the financial state institutions. Here obviously state *controlling* relations are involved, as the state of the Netherlands participates in one way or another in these firms. Top officials of the ministry of economic affairs sit on their boards. Obviously an important byproduct may be correspondingly good possibilities of access of these corporations to the state structure and its numerous committees and agencies of economic affairs. As we have here corporations in which, in addition to the state, private capital participates (Gasunie: Shell and Exxon (Standard Oil of New Jersey), National Investment Bank (NIB)), we may as well assume that the access and influence of such private actors or corporations is correspondingly enhanced. Of the other industrial sectors we know already from our discussion in § 3 that the heavy industrial sectors had the largest number of interlocks per firm: chemicals/oil (3.3) and metal/shipbuilding (3.0). Within the policy sector of economic affairs both of these are connected in particular with the subarea of "nuclear energy". Metal/shipbuilding, however, has a much larger spread across *subareas* within economic affairs, just as was the case for its spread across all *policy sectors* in § 3. Its interlocks with, for instance, the subareas of "energy" and "industrial development" are of equal weight. The penetration of chemicals/oil within economic affairs seems to be concentrated in particular in the subarea of "nuclear energy".

Our comparison has been thus far in terms of (average) number of interlocks per firm in a given industrial sector. Implicitly this assumes that within their capabilities of exercising influence in politics or state policy formation corporations operate and use their channels of influence disconcertedly and independently of each other. This seems to be a highly unrealistic assumption in modern capitalist societies. Theoretical and empirical analyses have repeatedly established highly oligopolistic, if not monopolistic, structures in industrial sectors, certainly in those sectors where giant corporations are found (*e.g.* Shepherd 1970; Mokken 1977). Cartel agreements, joint ventures, gentlemen's agreements, trade and business organizations, lobby and other pressure group organizations and many other forms of informal structure are available or will be created to promote the mutual or collective interests. Judged from this viewpoint, our statistic of average number of interlocks per firm tells only part of the story. Just the total number of interlocks for an industrial sector would be a better indicator of the amount of influence available to an industrial sector as a whole. Now if we return to our Table 4 a slightly different picture meets the eye. It is not different for "metal/shipbuilding". This sector looms large above the others with 24 interlocks and a large spread. The same is true for the "financial state institutions". It is more interesting to note that now "wholesale trade" (11 interlocks, 4 nuclear energy, 3 energy) comes next and is as important as "chemicals/

oil". Other sectors of importance are "electrotechnical metallurgy" (9) and the "building trade" (8). In this respect, apart from the spread, the specific orientation towards certain subareas is the remarkable feature of Table 4. It reinforces the suggestion that these interlocks serve to build up, support, or reaffirm communication and influence channels which are relevant to the economic or commercial activity characteristic of the industrial sector and associated with the policy area. For instance, "building" is connected mainly with "foreign trade relations", "industrial development" and the committee for the regulation of competition. These interlocks seem plausible, given the interests and participation of the major building and construction concerns in big development projects at home and abroad. Their possible involvement in the regulation of economic competition is plausible given the high degree of collusion and coordinate participation in terms of joint ventures that we found in our study of the joint venture network in the building trade (Helmers *et al.* 1975:282).[8]

The prominent role of the subarea of nuclear energy should be noted again. It is in particular interlocked with the state-owned natural gas corporation Gasunie (half state of the Netherlands – half Royal Dutch Shell–Exxon (Standard Oil of New Jersey)), the state-owned chemical DSM, metal/shipbuilding, electrotechnical/metallurgy, wholesale trade and the financial state institutions. The focus of this network appeared to be the Dutch nuclear energy research center *Reactor Centrum Nederland,* subsequently renamed *Energie Centrum Nederland* as one of the consequences of a reformulation of national energy policy after the oil crisis of 1973. In our study of 1969 it was connected to 13 corporations in our set by 20 interlocks, carried by eleven persons. Our findings here have since been further substantiated by a more detailed network analysis in the area of nuclear energy policy in the Netherlands, showing a tight network of prominent government advisory councils of the ministry of economic affairs, government-sponsored research institutions, the provincial or regional electricity authorities, and industrial participants from metal/shipbuilding (VMF, Rijn-Schelde-Verolme), electrotechnical (Philips) and the Dutch nuclear energy division of Shell.

This network of interlocking directorates and committee memberships was in this case found to correspond closely with an industrial joint-venture network in the area of nuclear research and development in which these corporations participated. These networks obviously were organizational derivatives of the joint industrial and governmental efforts to promote and build up the participation of Dutch industry and the Dutch economy in Western industrial nuclear development (Uitham *et al.* 1975; Zijlstra 1978,

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[8]For instance we found that the network of joint ventures connecting the five major building corporations was a complete graph.

see also the paper by Zijlstra in this issue).[9] The subarea nuclear energy, with its 32 interlocks in total, shared its position of dominating policy area within the policy sector of economic affairs with that of *foreign economic relations* (32 interlocks also). The interlocks of this subarea are more widely dispersed over industrial sectors. The position of the investment companies should be noted here: five of their six interlocks were in this area.

We may conclude our discussion of this policy sector with the statement, that at the level of their boards of directors the corporations and institutions of our study in terms of their interlocks clearly showed good access to all policy areas in economic affairs as far as they were perceivable within the framework of the government directory. Moreover, as was to be expected from our theoretical considerations, the more detailed analysis consistently showed these interlocks (and their resulting means of access and influence) to be oriented towards policy sectors and subareas which were also related and relevant to their industrial, economic or commercial activity.

7. The policy sector "education and sciences"

In the last section we could demonstrate a number of interlocks in the policy sector of economic affairs, involving top officials in the department of state in that sector. They were due mainly to active participation of the state in some industrial or financial corporate activity and suggested the direct formal control or influence of the state in the areas concerned. Such ties are absent for "education and sciences". The 177 interlocks between the 86 corporations and institutions and this state sector do not contain such top-level bureaucratic interlocks. Our results are presented in Table 5, where we have given for each industrial sector the interlocks with the various subareas of education and sciences.[10] Again we have only selected the industrial sectors showing interlocks.[11]

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[9] The political impact of the forces behind these networks in Dutch politics was measured by various recent clashes in Parliament. One concerned the disputed export of reactor vessels to the Union of South Africa by Rijn-Schelde-Verolme together with General Electric. Political pressures against this deal built up in Parliament in the fall of 1975. The issue did not reach its peak because South Africa at the last moment decided to grant the contract to a French consortium. More recently, increasing opposition by Dutch public opinion rose against planned expansion of the uranium enrichment plant at Almelo in the east of the Netherlands as part of a joint Anglo–German–Dutch project. Public action was in particular triggered off by the impending decision to export enriched uranium to Brazil. The issues were evaded in the Dutch Parliament through the decision of the prevailing coalition of the Christian-Democratic (CDA) and the conservative Liberal (VVD) parties to split them. In February 1978 they decided to permit the expansion of the enrichment plant and postpone ratification of the proposed export to Brazil to later years, awaiting further security and anti-proliferation guarantees, said to be expected of that country by that time.

[10] The total number of interlocks exceeds those mentioned in Table 2, because we have included here the academy of agriculture which organizationally is part of the domain of the ministry of agriculture and fisheries.

[11] Four of the 27 industrial sectors have no interlocks: chamber of insurance, real estate, glass and garments.

Table 5. *Interlocks of industrial sectors and education and sciences*

Industrial sector	I	II	III	IV	V	VI	VII	VIII	IX	X
Natural gas (Gasunie)	3	1		2		1			7	7.0
Foodstuffs	3		1						4	0.7
Textiles	4		1						5	1.7
Paper	1								1	0.3
Printing/publishing	1								1	0.3
Leather/rubber	2								2	1.0
Chemicals/oil	11	3	3	2	4	1			24	8.0
Chemicals (state-owned: DSM)	4		1	1					6	6.0
Metal/shipbuilding	13	3	2		5	1	1	1	26	3.3
Electrotechnical/metallurgy	6	1		2		1		3	13	2.2
Building trade	4	1	1		1	1			8	1.6
Rural development (KN Heide Mij)	2								2	2.0
Wholesale trade	3	1	1	1	1				7	0.9
Retail trade	6	1	1	1	1	1			11	3.7
Transport	6								6	1.0
Transport (state-owned), national railways (NS)	3			1	1			1	6	6.0
Communications (state-owned)	1	1		2					4	2.0
Commercial banks	8			1	1				10	3.3
Agricultural banks	2		1						3	1.5
Mortgage banks	2								2	1.0
Investment companies	8		2						10	3.3
Insurance companies	6							3	9	1.8
Financial state institutions	7		1	2					10	2.0
Total number of interlocks	106	12	15	15	14	6	1	8	177	2.1

I, academic institutions; II, science policy; III, university council (AR); IV, science foundation (ZWO); V, institutions of applied research (TNO); VI, nuclear energy; VII, technical occupational education; VIII, sundry; IX, total No. of interlocks; X, No. per firm.

We can immediately see that nearly all interlocks concern subareas associated with "scientific education and research and science policy". In 1969 a remarkably large number of interlocks were with the academic institutions: mainly the universities and polytechnics. About 60% of all interlocks with education and sciences were with the academic institutions: 106 interlocks, which connected 46 corporations and institutions with one or more academic institutions in the country.

In interpreting these results, however, we should point out that the situation here is that of before the fargoing legal reform of the Dutch university system (*Wet Universitaire Bestuursinrichting*), which was enacted in the first half of the seventies. Moreover, the government directory only listed the top officials of the main bodies of the universities and their faculties of that time. Not only were those the ones most affected by the reform, but our data consequently hardly covered the faculty staff and other academic leadership positions, which are also known to have sometimes close relations with major institutions of industry and government.

For the then principal executive bodies of the universities (*Colleges van Curatoren*) we have studied how many of the 97 interlocks could be attributed to the three polytechnics (Delft, Eindhoven and Twente), as we expected those to be especially connected with the corporate structure and, more specifically, heavy industries. More than one third of the interlocks of all university executive bodies (in total a dozen academic institutions) concerned these three polytechnics: 36 of 97. Of these 36, 7 were with the industrial sector chemicals/oil, 6 with metal/shipbuilding and 4 with electronical/metallurgy.

Another important center of interlocks was the university council (*Academische Raad*), which is the national coordinating and advisory body of the Dutch universities. It was connected with corporations by 15 interlocks, carried by seven persons.

The institutions in the area of scientific research also showed significant connections with the corporate structure. The national foundation for pure scientific research, ZWO,[12] is virtually the sole public institution in the Netherlands supporting academic research by grants. It was connected by 15 interlocks with 12 corporations. TNO,[13] a vast system of semi-public institutions for applied scientific research, showed a similar picture: 14 interlocks connected it with 13 corporations. In both cases seven persons carried the corresponding lines. Twelve interlocks in the area of "science policy" linked eleven corporations with the two principal coordinating or advisory bodies at the level of the central government, carried by six persons.

The policy area of nuclear energy in "education and sciences" again was mainly interlocked with the heavy industrial sectors. Finally, a closer analysis of the interlocks classified among "sundry" revealed that seven of these also could be considered to concern special topics of academic education or scientific research. *Therefore, only two of the 177 interlocks with this policy sector of education and science linking the boards of directors of the 86 corporations fell clearly outside the area of academic education, scientific research or science policy.*

The heavy industrial sectors, especially chemicals/oil and metal/shipbuilding, have a large number of interlocks with "education and sciences". It was interesting for us to note that the Dutch multinationals (AKZO, Shell, Philips and Unilever) in this policy sector showed numbers of interlocks which could be rated among the highest. Except for Unilever, not connected to education and sciences, the others had six interlocks or more. Their position here is much more dominant than was the case for the other policy sectors and, for that matter, the intercorporate network among the 86 corporations. In the latter case (except for the smaller multinational AKZO) their overall centrality was medium and they did not belong to the center of 17 most central firms, although they were closely connected to that center itself. The obvious explanation for us is the one mentioned before. Our selection of the largest Dutch corporations implied an emphasis

[12] Netherlands Organization for the Advancement of Pure Research (ZWO).
[13] Nederlandse Organisatie voor Toegepast-Natuurwetenschappelijk Onderzoek.

on the national scope of commercial and industrial organizational activity. As we saw, this resulted in a marginal position in the intercorporate network of those regional or rural oriented corporations which were selected in our study. By a similar argument the transnational or global orientation of the multinationals explains their less than central position. From this perspective these particular ties with the policy sector of education and science suggest a special national orientation.

We may conclude our analysis in the same manner as for the policy sector of economic affairs in the former section. In education and sciences the corporations we studied in 1969 showed, by the pattern of the interlocks of their boards of directors, good channels of access to relevant policy sectors in the state sector, as far as these were sufficiently covered by the government directory. The large number of interlocks, restricted wholly to the subareas of academic education, scientific research and national science policy, reflected the importance of these branches of education and research in particular for the corporate structure. From the side of the corporations these interlocks were generated especially by heavy industry and the multinationals. A strongly technological orientation of these connections is suggested by the conspicuous role of the polytechnics and the prominence of the subareas of science policy, nuclear energy and the foundations of pure and applied research, ZWO and TNO. This clearly evokes the picture of a network spanning the technostructure as one of the characteristic features in popular analyses of (post-)industrial societies.

8. Conclusion

Looking at the structure of the corporate–governmental network we conclude that the 86 national corporations and institutions, through interlockings of their top officials, have direct access to (semi-)governmental policy areas of direct relevance to them. This is particularly corroborated by the more detailed analysis of the sectors "economic affairs" and "education and sciences". Only the state-owned corporations and institutions have direct access to top officials of the ministries; the access of the other corporations is realized in the numerous semi-governmental institutions and committees that give advice during the preparation of governmental decisions and/or implement such decisions. The availability of good opportunities for access to levels of decisionmaking is strongly associated with political influences as the capacity to determine (partly), within a set of available alternative value allocations, the outcomes of the allocation process. Possession of superior means of access to decisionmaking centers may be not only a source of political influence, but also one of political power. This will be the case when specialized agencies possess more or less uniquely the knowledge that is necessary for the determination of certain policies (an information monopoly) in combination with superior possibilities of access to introduce (or derive) their information in (or from) decisionmaking at the right

times and in the right agencies (a monopoly of access). In such cases they have the capacity not only to determine the outcomes of the decision-making, but also the set of alternative value allocations that are available for decisionmaking (Mokken and Stokman 1976:49 - 50). However, whether such a monopoly of access exists for the large corporations on certain policy areas, cannot be ascertained by our study as it requires a comparative study of the access of different actors.

If expertise is strongly associated with certain institutions, these institutions will get direct access, through informal representation, to decision-making centers in those policy areas where such expertise is required. If it concerns an expertise that is required in a large number of policy areas, access is thus created to a wide variety of decisionmaking centers. Financial expertise is an example of such an expertise. Because financial expertise is strongly associated with top positions in large financial corporations and institutions, these agencies get a wide range of access to decisionmaking centers in different policy areas through informal representation, as can be observed in our data. In the basic industries on the other hand, we find a far more restricted expertise on a specific policy area. The network between these industries and the governmental agencies will therefore be far more concentrated on a limited number of decisionmaking centers. Here indeed we find a large penetration in a small number of policy areas.

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